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Split Nitrogen Application Trial

Mark A. Licht
Iowa State University, lichtma@iastate.edu

Kent R. Berns
Iowa State University, krberns@iastate.edu

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Abstract
Farmers understand it is best to apply nitrogen to the crop at or right before rapid growth occurs. However, 100 percent in-season nitrogen applications are faulted because of potential for unfavorable weather conditions delaying applications and subsequent deficiency occurring. This trial looks at how split nitrogen applications can be used to address environmental risks of pre-plant nitrogen application as well as unfavorable application conditions in-season.

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Split Nitrogen Application Trial

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Mark Licht, field agronomist
ISU Extension
Kent Berns, farm superintendent
Central Iowa Research Farms

Introduction

Farmers understand it is best to apply nitrogen to the crop at or right before rapid growth occurs. However, 100 percent in-season nitrogen applications are faulted because of potential for unfavorable weather conditions delaying applications and subsequent deficiency occurring. This trial looks at how split nitrogen applications can be used to address environmental risks of pre-plant nitrogen application as well as unfavorable application conditions in-season.

Materials and Methods

This trial was conducted with Pioneer 33W84 planted into the previous year's soybean residue on May 5, 2011 at 34,000 seeds/acre. Each plot was 30 ft wide by 150 ft long. Nitrogen pre-plant treatments were applied prior to planting on May 5 and at the V6 growth stage for the post-plant applications; both as injected urea ammonium nitrate. The treatments consisted of four pre/post nitrogen applications of 0/140, 50/90, 90/50, and 140/0 lb N/acre. A fall blanket application of potash was applied at 120 lb K/acre based on soil test analysis. Soil test phosphorus was adequate and no additional phosphorus was applied.

Yields were collected using a John Deere 9410 equipped with a Harvest Master weigh system. Additional data collection included spring and fall plant population, late spring nitrate analysis, fall stalk nitrate analysis, and grain moisture at harvest.

Results and Discussion

Spring and fall plant populations were not significantly different among the four treatments averaging 31,325 and 31,110 plants/acre, respectively. The late spring nitrate analysis was not significantly different across treatments but was quite variable ranging from 6.5 to 13.0 ppm. Fall stalk nitrate analysis data was very consistent and was not significantly different.

Grain moisture was significantly different. The 140/0 treatment had significantly lower grain moisture than the other treatments and the 90/50 treatment had significantly lower grain moisture compared with the 0/140 treatment. Personal observation showed higher in-season nitrogen rates resulted in less nitrogen deficiency systems later in the season.

Grain yields were also significantly different. Like grain moisture, higher yields were realized at the higher in-season nitrogen rates. This again can be attributed to personal observations where less nitrogen stress was observed as in-season nitrogen rates increased.

Table 1. Spring plant populations, late spring nitrate concentration, fall stalk nitrate concentration, fall plant population, grain moisture, and grain yield for four split nitrogen application treatments, Ames, Iowa in 2011.

Pre-plant N	Post-plant N	Spring plant population	Last spring nitrate	Fall stalk nitrate	Fall plant population	Grain moisture	Grain yield
# N / acre		plants/acre	ppm		plants/acre	%	bushels/acre
0	140	30,875	6.5	23	30,688	19.3	195.38
50	90	32,125	9.5	22	30,813	18.3	185.03
90	50	32,625	12.0	22	31,938	18.0	175.68
140	0	31,675	13.0	22	31,000	17.2	161.26
Pr > F		0.3055	0.3949	0.9217	0.5402	0.0042	0.0109
$LSD_{(0.05)}$						0.8	16.4